ASH GROVE CEMERT COMPANY



November 5, 1999

Mr. James Nolan Director, Compliance Division Puget Sound Clean Air Agency 110 Union Street, Suite 500 Seattle, WA. 98101-2038

Re: Consent Order and Assurance of Discontinuance Civil Penalty Nos. 8760, 8761, 8801, 8929

Dear Jim:

Please find enclosed for PSCAA's review a copy of the report <u>Investigation of Potential Fugitive Clinker Dust Source(s)</u> and <u>Evaluation of Improvement Projects</u> by C. David Maars, Consultant.

Gerald J. Brown

Yours truly;

Manager, Safety and Environment

Enclosure

cc:HV



CONSENT ORDER AND ASSURANCE OF DISCONTINUANCE

INVESTIGATION OF POTENTIAL FUGITIVE CLINKER DUST SOURCE(S) AND EVALUATION OF IMPROVEMENT PROJECTS

by

C. David Maars, Consultant

November 2, 1999 Bow, Washington

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INVESTIGATION OF POTENTIAL FUGITIVE CLINKER DUST SOURCE(S) AND EVALUATION OF IMPROVEMENT PROJECTS

Ash Grove Cement Company (Ash Grove) and the Puget Sound Air Pollution Control Agency (PSAPCA) entered into a Consent Order and Assurance of Discontinuance, (AOD) (Appendix 1), on November 24, 1998. The AOD was accepted by Ash Grove on December 9, 1998.

The AOD required Ash Grove to "submit a study plan to investigate the source(s) of fugitive clinker emissions" and "a list of potential projects to reduce fugitive clinker emissions." The study plan and potential projects to reduce fugitive clinker emissions (Appendix II) were sent to PSAPCA on January 21, 1999. The submittal was accepted by PSAPCA on April 1, 1999.

A consultant was retained to investigate the source(s) of fugitive clinker emissions and evaluate the feasibility and cost effectiveness of the projects in accordance with the requirements of the AOD. This report is the result of the consultant's investigation and evaluation.

The investigation was accomplished during four visits to the Ash Grove Plant in the month of June. The investigation included observations of the kiln and cooler systems in operation, the clinker transport and distribution systems, discussions with the managers and operators and observation of the plant appearance in general.

Ash Grove has completed numerous projects over the past five years to capture and/or prevent the generation of fugitive clinker emissions. The focus of the current investigation is to identify remaining potential fugitive emission points within the plant, and to suggest possible methods to reduce or eliminate those emissions. The scope of the current investigation did not include evaluating the effectiveness of the completed control projects, or assessing the environmental significance of the remaining sources of fugitive clinker emissions. This report reaches no conclusions about whether fugitive emissions from the Seattle plant require additional control measures. Its focus is limited to identifying locations within the plant that still have the potential to generate fugitive clinker emissions.

Summary

The investigation identified several potential sources of fugitive clinker emissions. The satellite cooler system has the most potential. Clinker dust escapes from the cooler tubes through holes left when liner bolts break and fall out. The kiln has to be stopped and cooled for repair personnel to plug the holes.

The annular space between the satellite cooler tubes and the discharge housing may allow fugitive clinker dust to be emitted when the kiln is being heated in preparation for start-up. Any abnormal operation has the potential for fugitive clinker emission from this area. Fugitive clinker dust may also be emitted during normal operation because all the hot air in the cooler discharge housing may not go into the cooler tubes and some may go out through the annular space at the top. The dust collector venting the discharge housing should have adequate capacity to keep the discharge housing under slightly negative pressure to keep dust from escaping.

Some lesser potential fugitive clinker sources are the G-cooler. Mechanical wear on the clinker carrying tubes could cause holes through which clinker could get into the cooling air stream. Also, clinker conveyor transfer points and housekeeping in general are potential sources of fugitive clinker emissions.

The buildings that enclose the areas where fugitive clinker dust may be generated should have their doors closed to prevent fugitive clinker dust from escaping.

There are two intermittent potential sources of fugitive clinker emissions. One is the possibility of generating fugitive clinker emissions when material is removed from the clinker diversion bin located by the G-cooler for transport to the clinker storage shed. The others are the two conveyors used to transport clinker between the clinker silos and the storage shed. These conveyors are approximately 80 feet above ground and any clinker adhering to the belt surface could become airborne as the belts return. The elevator feeding the belt transporting clinker to the silos is also a potential source.

Plant operations, employee training and housekeeping were all found to be average to very good. Improved housekeeping would assist in minimizing the potential for fugitive clinker dust generation.

There should be on-going communication with the employees to emphasize the necessity to protect the environment, be a good neighbor and to perform their tasks properly.

The goal of the managers and operators should be to continually make improvements to plant operations so that it will run better. This will pay dividends with better production, lower operating costs and better equipment reliability. The potential for generating fugitive clinker emissions is the lowest when the plant runs at its best.

Introduction

Ash Grove and PSAPCA entered into a consent order and AOD to satisfy civil penalties Nos. 8760, 8761, 8801 and 8929. The AOD required a study plan be developed to investigate potential source(s) of fugitive clinker emissions and identify projects to reduce the potential for fugitive clinker emissions.

A consultant was to be retained by Ash Grove to do the investigation to identify the potential source(s) of fugitive clinker emissions and to determine the feasibility and cost effectiveness of the proposed projects. The consultant was to prepare a report on the findings of this investigation and the project evaluations.

The investigation included a review of the operations to identify potential source(s) of fugitive clinker emissions, operating procedures that could contribute to fugitive clinker emissions, employee training in regard to protecting the environment and environmental issues and the general appearance of the plant with emphasis on cleanliness.

Suggestions and recommendations are made as a result of the investigation to address the potential source(s) of fugitive clinker emissions and improve overall plant operations to keep fugitive clinker emissions to a minimum.

PART I

POTENTIAL SOURCE(S) OF FUGITIVE CLINKER EMISSIONS

The investigation began with review and observation of the kiln and clinker handling systems. The investigation found that potential sources of fugitive clinker dust are:

1. The satellite clinker cooler

- a. The bolts holding the liners in the cooler tubes can break periodically. The
 broken bolts fall out leaving a hole through which clinker dust can escape.
 Clinker dust can filter through the small spaces between the liner plates and out
 the bolt holes.
- b. Fugitive clinker dust may come out of the annular space between the satellite cooler tubes and the discharge housing. This may occur when the discharge housing becomes positive when the kiln is being heated for start-up and during abnormal kiln operations. Also fugitive clinker dust may escape if the top of the discharge housing becomes positive because of hot air in the housing rising faster than the cooler and dust collector vent can remove it.
- 2. Fugitive clinker dust may be exhausted with the air cooling the clinker in the G-cooler. This may occur because of holes caused by mechanical wear on the tubes carrying the clinker as the clinker moves through the tubes allowing clinker dust to get into the cooling air stream.

- 3. Fugitive clinker dust may come from the top of the building enclosing the pan conveyor transporting clinker from the satellite clinker cooler to the G-cooler because of the chimney effect due to the hot environment in the building.
- 4. Fugitive clinker dust may come from the area beneath the G-cooler at the transfer point from the G-cooler to the clinker transport conveyor to the clinker silos.
- 5. Fugitive clinker dust may escape from the enclosure on top of the clinker silos because of dust generated at the transfer points between the distribution conveyors.
- 6. Fugitive clinker dust may come from beneath the clinker silos during clinker withdrawal.
- 7. Fugitive clinker dust may come from the enclosure on top of the finish mill clinker feed bins when clinker is discharged from the transport conveyor into the clinker bins.
- 8. Potential sources from infrequently used equipment:
 - a. Removing clinker from the clinker diversion bin located by the G-cooler for transport to the clinker storage shed may create fugitive clinker dust.
 - b. Conveyors transporting clinker between the clinker silos and the clinker storage shed. These two conveyors are open on the return side of the conveyor. This may allow any clinker dust adhering to the belt to become airborne when the belt returns.
 - c. The clinker elevator discharge to the transport belt from the clinker storage shed to the clinker silos may allow fugitive clinker dust to escape into the air if it is not tightly sealed and properly vented to the dust collector in this location.

PART II

DISCUSSION OF INVESTIGATION

Section 1. Discussion of Potential Source(s) of Fugitive Clinker Dust Emissions

Satellite Cooler

The method for installing the satellite clinker cooler liner plates should be investigated to determine if there is a method of holding them in place without using bolts. If not, maybe there is a method that uses fewer bolts. Also it should be determined if there is a

better alloy than the one currently used to make the bolts as well as a better design which will make the bolts more resistant to breaking.

The method used at the present time to stop clinker dust from escaping through the bolt holes is to stop the kiln and allow it to cool so a welder can weld a plug in the hole. Water is sprayed on the cooler tubes to contain the dust until a stop can be scheduled. (Figure 1, page 6)

Satellite Cooler Discharge Housing

The satellite cooler discharge housing is vented during normal operation by the kiln induced draft (ID) fan pulling combustion air through the cooler tubes to cool the clinker.

This keeps the discharge housing under negative pressure preventing fugitive clinker dust from escaping through the annular space between the cooler tubes and the discharge housing (Figure 2, page 7). However, it appears that the hot air rising to the top of the discharge housing has enough energy to possibly overcome the suction caused by the kiln. If the dust collector vent venting the top of the discharge housing does not have enough volume to take the hot air away this air will escape through the top portion of the annular space between the cooler tubes and the discharge housing. It should be determined if the dust collector venting the top of the clinker cooler discharge housing has enough volume to overcome the resistance in the long dust collector duct between the discharge housing and the collector and properly vent the other pieces of equipment vented by it (Figure 3, page 8).

The dust collector venting the clinker cooler discharge housing is the only source of suction when the kiln is being heated for start-up and during other times of abnormal kiln operation when the ID fan provides little suction. An additional dust collector dedicated to venting the discharge housing may be required to provide adequate suction to keep the discharge housing under negative pressure during these times. The dust collector would have to have a variable inlet to control the suction as required during normal and abnormal kiln operational The dust collector bags would have to be able to withstand high temperatures.

Pan Conveyor Enclosure

The pan conveyor transporting clinker from the satellite cooler to the G-cooler is in an enclosure (Figure 3, page 8). The discharge of the pan conveyor is in the enclosure on top of the G-cooler. Proposed Project No. 2, page 24, is to install a wall in the enclosure at the conveyor discharge to negate the chimney effect caused by the hot air in the conveyor enclosure. The project includes relocating the dust collector vent to better vent the conveyor enclosure. This project has been completed except for installing a door in the walkway along the pan conveyor. (Note: The same dust collector vents the clinker

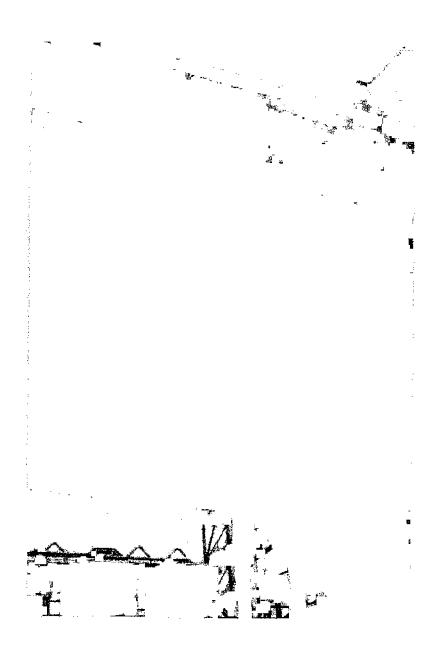


Figure 1: Water Spray to Control Clinker Dust Coming from Bolt Hole in Cooler Tube

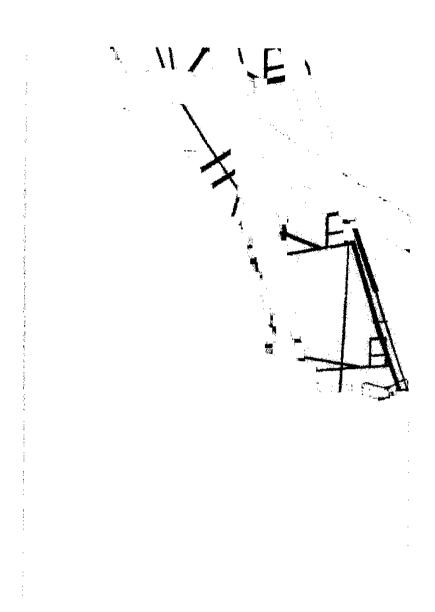


Figure 2: Annular Space Between Satellite Cooler and Discharge Housing



Figure 3:
Dust Collector Vent to Cooler Discharge Housing

cooler discharge housing.) The wall was also installed to reduce the temperature at the pan conveyor discharge area so maintenance could be performed better when the kiln is in operation. Air currents still exist in this area when the building doors are opened to permit entry. The doors should be maintained and the area around them kept clean so they can be easily closed to prevent fugitive clinker dust from escaping the building.

G-Cooler

The tubes in the G-cooler that carry the clinker should be routinely inspected for holes. Small holes in the tubes caused by clinker moving through them may develop over time allowing clinker dust to get into the cooling air stream. Any holes should be plugged to prevent clinker from getting into the air stream.

Clinker Transport to Clinker Silos

An impact sled has been installed at the transfer point where clinker leaves the G-cooler and goes onto the transport belt to the top of the clinker silos with good success. This transfer point is open on the north and east sides potentially allowing fugitive clinker dust to escape. This device allows for the use of more rigid, easily adjustable skirting to form a better seal between the discharge hopper and the belt. Some leakage still occurs which can be carried away by air currents. Keeping the skirting properly adjusted, replaced when worn and removing the minimal spillage that does occur should keep fugitive clinker dust from developing.

Clinker Silo Distribution System

The many clinker transfer points in the distribution system at the top of the clinker silos are potential sources of fugitive clinker dust generation. A new distribution system (Project #4, page 26) utilizing a drag chain conveyor should eliminate all but one of the transfer points. The only transfer point remaining will be the one from the clinker transport belt to the new distribution system. The conveyor systems connecting the dock and the clinker storage shed will remain as they are. The drag chain runs in an enclosure keeping the possibility of clinker dust generation to a minimum. The doors of the enclosure on top of clinker silos should be kept closed to contain the clinker dust.

Clinker Silo Withdrawal

The clinker withdrawal system under the clinker silos has many transfer points which can generate clinker dust. The access doors to the area under the silos should remain closed to contain the clinker dust under the silos.

Clinker Transport to Finish Mill Bins

Clinker transported from the clinker silos to the finish mill bins is distributed to the finish mill clinker bins using a tripper. The installation of a new additional dust collection system (Project #2, page 26) using a 6000 acfm dust collector and a "Zipper Duct" (Figures 4 and 5, page 11) has been completed. Although this has cleaned up this area, the equipment access door and the door to the building roof should remain closed to assure any clinker dust that my be generated is contained.

Potential Sources From Infrequently Used Systems

There are three potential sources of fugitive clinker dust from systems that are only operated infrequently:

- 1. The removal of clinker from the clinker diversion bin (Figure 6, page 12) located by the G-cooler is a potential source of fugitive clinker dust. This clinker is loaded into a covered dump truck to be hauled to the clinker storage shed.
- 2. The clinker transport belts (Figure 7, page 12) between the clinker silos and the clinker storage shed are only partially enclosed directly over the top of the belt. These conveyors are at an elevation of approximately 80 feet where any clinker dust adhering to the belt may become airborne on the return side of the conveyor.
- 3. The elevator transporting clinker from the clinker storage shed to the transport belt to the clinker silos (Figure 8, page 13) may cause fugitive clinker emissions where it discharges onto the transport belt it if is not adequately vented by the adjacent dust collector.

Section 2. Operations Influence on Control of Fugitive Clinker Emissions

The plant is operated from a central control room. A control room operator controls the plant equipment through a computer interface. Starting, stopping and process adjustments are made by the operator based on data received from field sensing devices, data from the laboratory and requests by personnel in the field. Simple as well as sophisticated optimizing computer programs are used to control the processing equipment within predetermined parameters.

The main emphasis of the control room operator is to control the kiln system, the heart of the plant, which is the most difficult piece of equipment to control. The kiln system has the least effect on creating fugitive clinker dust when it is in steady-state operation. When the kiln gets upset or stops the potential for the generation of fugitive clinker dust is greatest.



Figure 4
Tripper Car Dust Collector Vent Connecting to Zipper Duct



Figure 5:
Additional Dust Collector System Venting Tripper Car on
Top of Finish Mill Clinker Bins

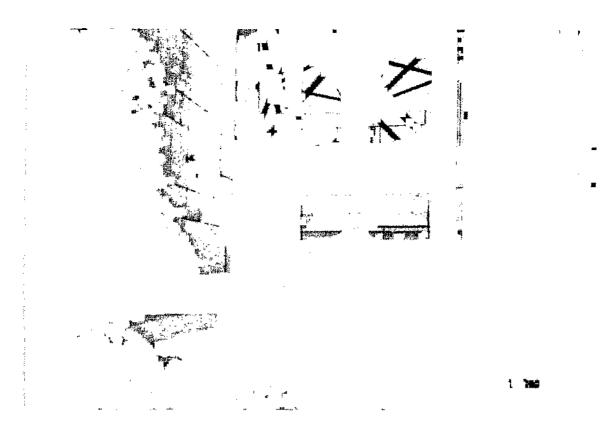


Figure 6: Clinker Diversion Bin Loadout

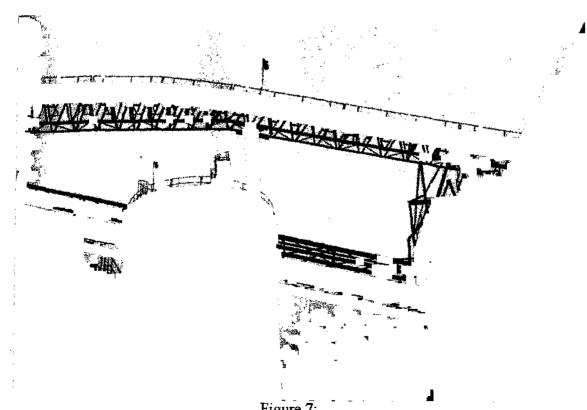


Figure 7:
Clinker Transport Conveyors Between Clinker Silos and Storage Shed

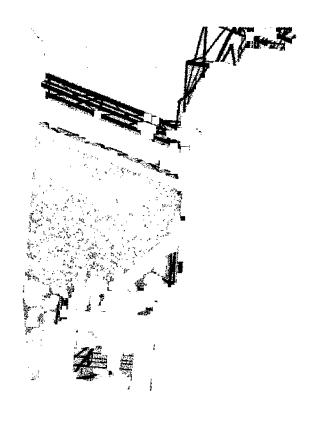


Figure 8: Clinker Elevator from Clinker Storage Hall to Clinker Transport Belt to Clinker Silos

The plant philosophy is to operate the kiln at a production rate just less than it's maximum production capability. The kiln is easier to control at this production level and will minimize the number of upset conditions and extend the kiln run time as it is easier on the equipment. This philosophy will give the best total production over time.

The Quality Control Manager establishes the kiln feed chemistry and other kiln feed control parameters to get optimum kiln efficiency and produce a quality product. Uniform kiln feed will give optimum performance. More kiln control adjustments are required when the kiln feed varies. This creates a greater chance for upsets.

The plant has installed a "fuzzy logic" kiln control system which incorporates many parameters in the calculations it uses to control the kiln system. This is not being utilized at the time of the investigation. The control room operators choose to run the kiln using manual control which requires more operator attention.

Used tires are fed to the kiln feed end to supplement the coal used to heat the kiln. This requires more attention of the helpers in the field to keep material build-ups from occurring in the preheater. These build-ups can plug the chutes in the preheater if they become too large shutting the kiln down immediately. The kiln becomes pressurized when this occurs causing fugitive clinker dust to escape from the cooler discharge housing.

Possibly the biggest problem faced by the plant operators is when a clinker cooler tube liner bolt breaks. This may allow a small amount of clinker dust to escape through the bolt hole. The kiln has to be shut down and cooled for a short time before the bolt hole can be plugged. Water is sprayed in the area of the clinker leakage to minimize the fugitive clinker dust migration from the cooler area (Figure 1, page 6).

The control room operator has to control the kiln temperature high enough to burn the clinker properly as determined by laboratory tests which determine how well the clinker is burned. When clinker is not burned well enough for the clinker reactions to go to completion the clinker is finer increasing the possibility of fugitive clinker dust. Clinker quality parameters should be created that give well burned clinker.

Under-burned and off-specification clinker is put in a clinker diversion bin located by the G-cooler if it cannot go to the clinker silos. This material is loaded into a covered truck from the clinker diversion bin and transported to the clinker storage shed. This is kept to a minimum at the present time as it potentially can create fugitive clinker dust while being loaded and transported to the clinker storage shed.

Recommendations

- 1. An investigation should be undertaken to determine if changes to kiln operation can be made to prevent build-ups from occurring that cause the preheater to plug and the kiln to be stopped immediately.
- 2. Re-establish the optimum feed rate of the tires to the kiln.
- 3. Establish clinker quality parameters so the clinker is well burned to minimize the amount of fine clinker coming from the kiln.
- 4. Utilize the "fuzzy logic" kiln control system whenever possible.
- 5. Keep management's kiln operation philosophy of operating the kiln at a production rate just less than maximum production capability in mind and don't push the kiln too hard.
- 6. Use the clinker diversion bin as a last resort.
- 7. Install impact sleds at conveyor transfer points.

Section 3: Housekeeping-Keep the Plant as Clean as Possible

Housekeeping at the plant is average to good based on comparisons with other plants. The roadways and other paved areas are swept with a road sweeper whenever possible.

A water truck is also used to control dust in areas the road sweeper cannot go and when the sweeper cannot be used.

Keeping the plant and grounds clean is done by the Buildings and Grounds Department under the direction of the Production Manager. Temporary workers are hired when extra clean-up is required. Areas requiring clean up observed by the shift supervisor are communicated to the Production Manager for action.

The best way for improving housekeeping is to keep the material contained and make those improvements necessary to insure that it remains where it belongs.

Specific Areas

The following are specific areas of the plant to concentrate on keeping clean of fugitive clinker dust:

- 1. Roadways. Use sweeper as much as possible on paved areas. (Keep sweeper in good repair so it doesn't generate dust). Use water truck on unpaved areas and when sweeper cannot be used.
- 2. G-Cooler. Keep the area around the transfer point from the G-cooler to clinker transport belt to clinker storage clean.
- 3. Clinker pan conveyor discharge to G-cooler. Keep man doors closed. Project #1, page 20 (wall to isolate incline from bucket conveyor discharge) will help control dust.
- 4. Top of clinker silos. Project #4, page 26 (drag chain distribution system) will eliminate almost all belt conveyor transfer points making area clean. Keep man doors closed
- 5. Bottom of clinker silos. Keep doors closed.
- 6. Top of finish mill clinker bins. Project #2, page 26 (installation of new dust collector) will make this area easier to keep clean.

Section 4: Employee Training

<u>New Employees.</u> New employees are given environmental training. The environmental training contains a section concentrating on dust emissions. Emphasis is placed on dust coming from equipment, i.e., dust collectors, stacks, conveyors, etc. The employees are told that any visible emissions are to be reported to a supervisor.

The program also emphasizes the control of fugitive dust in all areas of the plant. It is stressed that keeping dust generation to a minimum is part of performing all tasks at the plant. Good housekeeping practices are a big part of the training program.

Refresher Training

A four hour environmental awareness training program was given in October 1997 to all employees. The employees were broken down into small groups. The importance of protecting the environment and being a good neighbor was stressed by the Plant Manager's introduction of the program.

The training program was presented by the Safety/Environmental Manager. The presentation stressed the many aspects of environmental protection with emphasis on air and water

Employees are instructed to watch for any problems that may cause dust emissions and report them to the supervisor. A "work order" system is used to pass on to the Maintenance Supervisor repairs that are required. Minor repairs are done by the Shift Technicians and are not part of the "work order" system. These repairs are recorded in the shift log.

Protecting the environment is the general concern for all employees. The electrical and mechanical maintenance personnel have been instructed to keep dust generation to a minimum when doing their work. A reminder is not always given when work is assigned as the manager or supervisor believes that all employees are supposed to know they are to protect the environment as part of working at the plant. Therefore, performing repairs properly and correctly are left up to the integrity of the workers with minimal follow-up.

The Building and Grounds Department and other personnel responsible for keeping the plant operating smoothly are trained to perform their tasks in a manner that will prevent dust. A reminder to prevent dust is not always given to them when tasks are assigned as they are supposed to know this. The responsibility to do their job properly is left up to them with little follow-up being done.

The major emphasis on controlling fugitive dust is given in the awareness training program. This is continually reinforced in the normal association with the employees and supervisors.

Contractor Instruction

There is no formal instruction given to contractors and other non-Ash Grove personnel except for temporary laborers hired for special clean-up tasks. The temporary laborers are given formal instruction in safety and the importance of protecting the environment. They are instructed on the methods to be used in the clean-up process to prevent dust generation.

Suggestions and Recommendations

The environmental training for new employees and the refresher training is very good. The refresher training should be given on a regularly scheduled basis to re-emphasize its importance and to make the employees aware of new regulations and other developments in the environmental arena.

Maintenance and clean-up tasks should include some discussion on dust prevention and anything else that may affect the environment. Although the workers are trained in performing their tasks correctly more follow-up should be done to make sure the task is done right so the equipment will perform as it was intended.

There should be formal instructions given to outside contractors on protecting the environment for both air and water. This should be incorporated into the contract in the same manner as safety items. Any special precautions or instruction should be included.

PART III CONCLUSIONS AND RECOMMENDATIONS

- 1. The method of installing liners in the satellite clinker cooler tubes should be reviewed to determine if there is a way to install the liners without using bolts or using fewer bolts. Determine if there is a better alloy and/or bolt design that would reduce bolt breakage.
- 2. Determine if the dust collector venting the clinker cooler discharge housing is of adequate capacity to maintain a negative pressure at the top of the housing during normal operations while it vents the other pick-up points attached to it.
- 3. A study should be made to determine if there is a way to vent the discharge housing when the kiln is being heated and during periods of abnormal operation. An additional dust collector dedicated to venting the cooler discharge housing with a variable inlet and high temperature bags may be required.
- 4. The clinker carrying tubes in the G-cooler should be inspected routinely for holes caused by clinker moving through them. Plugging the holes will prevent clinker from getting into the cooling air stream.
- 5. Impact sleds should be installed at clinker conveyor transfer points so that minimum clearance can be maintained between the skirting and the conveyor belt
- 6. Doors to the building at the head end of the clinker pan conveyor, top and bottom of the clinker silos, top of finish mill clinker bins and other places where clinker is handled should be kept closed.

- 7. Employee education should be ongoing. Employees should be reminded that proper repair and operating procedures be used which include doing the work without creating dust. Follow-up is required to insure proper procedures were used.
- 8. Good housekeeping is a must to lessen the potential for fugitive clinker emissions. Correcting problems that increase clean up and making modifications to lessen fugitive clinker from escaping the process should be ongoing. "If you don't allow it to get out, you don't have to clean it up."
- 9. Communication and instructions to outside contractors and other non-company workers is necessary to get their help in preventing fugitive clinker emissions. Consideration should be given to preventing dust generation in their work procedures. This requirement should be included in the work rules given to outside contractors.

EVALUATION OF POTENTIAL PROJECTS TO REDUCE SOURCES OF FUGITIVE CLINKER EMISSIONS

There were four projects to reduce sources of potential fugitive clinker emissions submitted in regard to the AOD.

They are:

- 1. Isolate the head end of the pan conveyor at the top of the G-cooler. An interior wall is to be constructed to separate the head end of the incline section of the pan conveyor.
- 2. Install a 4,000 acfm zipper duct to the tripper car and a 2,000 acfm duct to the head pulley of the existing transfer conveyor. Both ducts will be connected to an additional 6,000 acfm dust collector. The 6,000 acfm dust collector will exhaust beneath the floor into the mill building.
- 3. Evaluate the conversion of the five existing dust collectors on top of the clinker silos to pulse jet type collectors.
- 4. Evaluate the conversion of the five existing open belt conveyors on top of the clinker silos to a drag chain conveyor system to eliminate ten transfer points. If this project is considered it will be an alternative to Project No. 3.

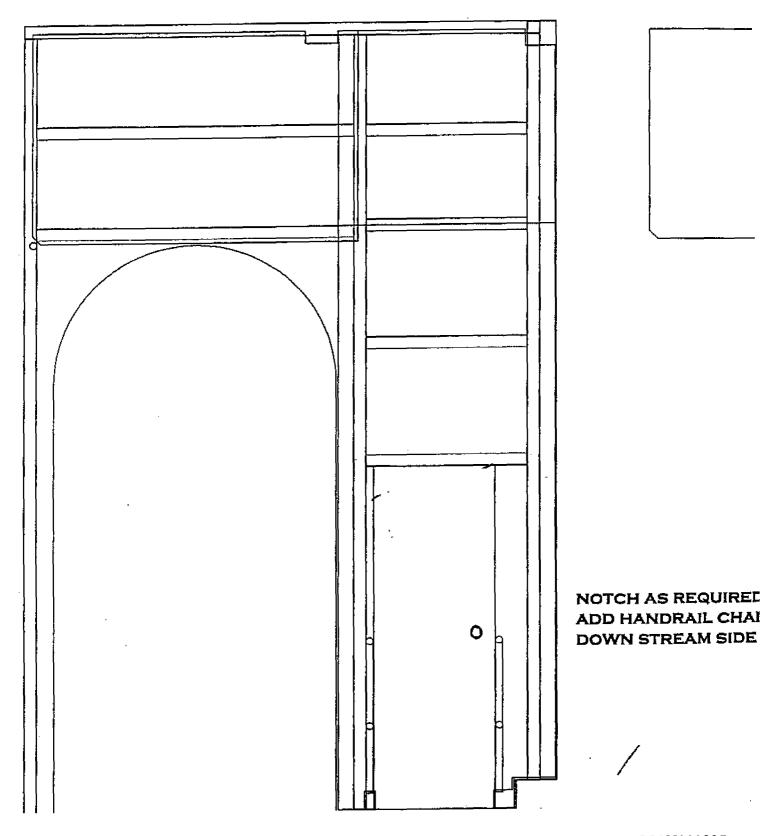
Evaluation and Feasibility

Project No. 1: Isolate the Head End of the Pan Conveyor at the Top of The G-Cooler (Drawings 1, 2 and 3, pages 21, 22 and 23)

The wall to separate the head end of the pan conveyor at the top of the G-cooler has been installed. (Figures 9 and 10, page 24). A dust collector vent has been installed (Figure 11, page 25) to better vent the incline portion of the pan conveyor enclosure. A door will be installed in the doorway during the next scheduled kiln outage for maintenance.

The wall has accomplished the desired effect of reducing the temperature in the head house and negating the chimney effect created by the hot air in the pan conveyor enclosure. The movement of air when the building access doors are opened is significantly reduced therefore causing less fugitive clinker emissions. The access doors still should be kept closed to prevent fugitive clinker dust from escaping.

Project Cost: \$8,000.00



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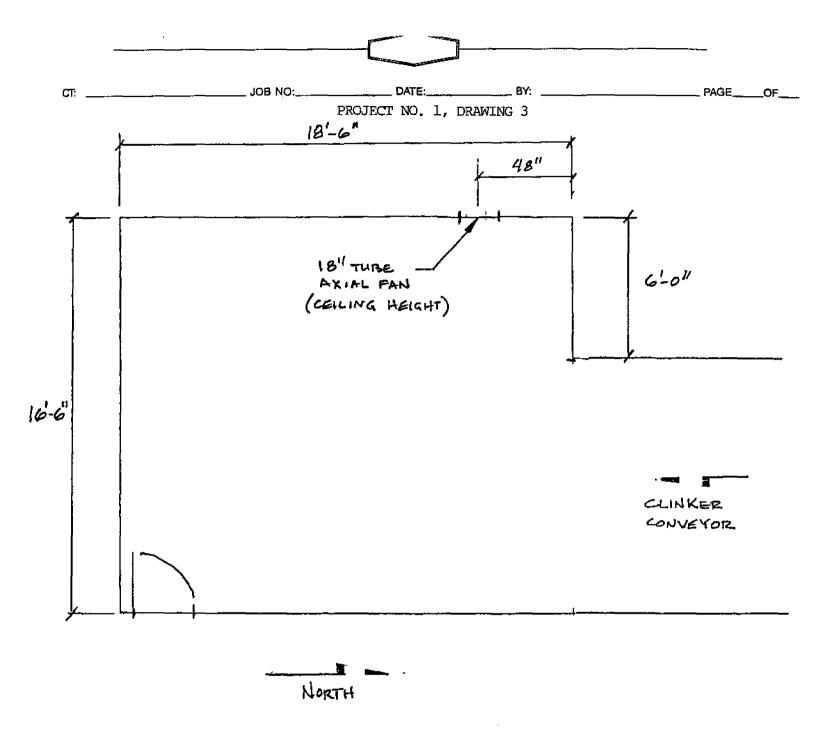




Figure 9: Wall above Door to Incline Section of Pan Conveyor Enclosure

Figure 10: Entrance to Incline Section of Clinker Pan Conveyor Enclosure

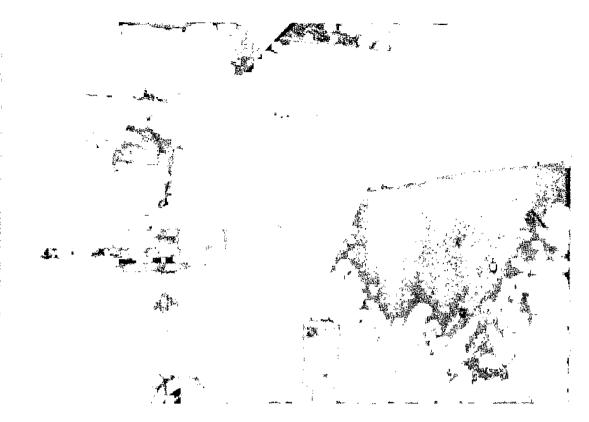
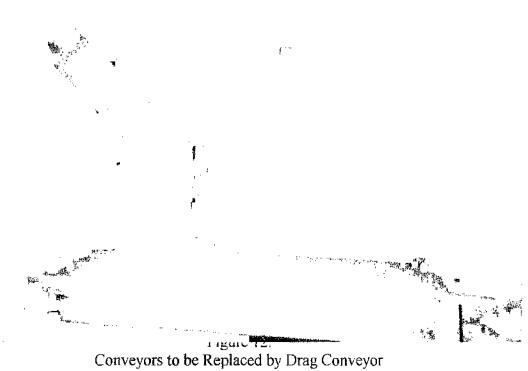


Figure 11: Dust Collector Vent to Incline Section of Clinker Pan Conveyor Enclosure



Project No. 2: Install Additional Dust Collector on Top of Finish Mill Clinker Bins (Drawing 1, page 28)

The additional 6,000 acfm dust collector and dust collector ducts to vent the tripper car and the head pulley of the existing clinker transfer conveyor have been installed on top of the finish mill clinker feed bin (Figure 5, page 11). The dust collector duct connected to the tripper car is of a "zipper" duct design (Figure 4, page 11). This is so named as the duct attached to the tripper car slides in a flexible opening in the side of the dust collector duct going to the dust collector.

The additional dust collector is exhausted into the finish mill building beneath the floor of the tripper room. The finish mill building is kept under negative pressure by the high-efficiency cement separator dust collection systems.

The addition of this dust collection system has greatly reduced the fugitive dust created by the discharge of the clinker into the finish mill feed bins (Figure 5, page 11).

Project Cost: \$30,000.00

Project No. 3: Convert Dust Collectors on Top of Clinker Silos to Pulse Jet

The evaluation of the conversion of the 5 existing dust collections on top of the clinker silos to pulse jet type will not be done if project No. 4 is selected.

Project No. 4: Install Drag Chain Conveyor on Top of Clinker Silos (Drawing 1, page 29)

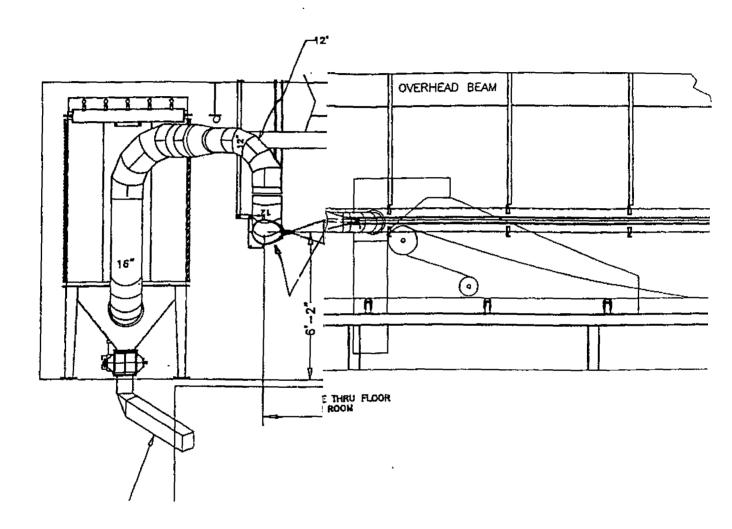
The conversion of the five existing open belt conveyors on top of the clinker silos (Figure 12, page 25) to a drag chain conveyor system (Drawing 1, page 29) to eliminate ten transfer points has been accepted and approved for installation during the winter 2000 annual kiln maintenance period.

The drag chain distribution system will greatly reduce the generation of fugitive clinker dust because of the enclosed design. The only transfer point is where the clinker transport from the G-cooler to the top of the clinker silos discharges into the new drag conveyor.

The existing distribution system from the dock to the top of the clinker silos will remain to transport gypsum.

The clinker transport conveyor from the clinker storaage shed will also remain discharging into silos five and six.

Project Cost: \$675,000.00



CLINKER STORAGE SILOS

APPENDIX

APPENDIX I:

CONSENT ORDER AND ASSURANCE OF DISCONTINUANCE (AOD)



PUGET AIR POLLUTION CONTROL AGENCY

KING COUNTY

KITSAP COUNTY

PIERCE COUNTY

SNOHOMISH COUNTY

April 1, 1999

Henrik Voldbaek Plant Manager Ash Grove Cement Company 3801 East Marginal Way South Seattle, WA 98134

Re: Consent Order and Assurance of Discontinuance Civil Penalty Nos. 8760, 8761, 8801 and 8929

Dear Mr. Voldbaek:

Thank you for your letter of March 18 responding to the review and comments to the Ash Grove study plan. We recognize the latitude of Ash Grove, as set forth in the Consent Order and Assurance of Discontinuance (AOD). None-the-less, we are disappointed that Ash Grove did not find it reasonable to incorporate our comments into the study plan.

We look forward to receiving a copy of the consultant's written report of the feasibility study within the timelines set forth in the AOD.

Sincerely.

Manager-Inspection

cc:

Jim Nolan

Laurie Halvorson

Rick Hess

Melissa McAfee

Elizabeth Gilpin

Fred Austin

Dennis J. McLerran, Air Pollution Control Officer

DIRECTO

STATE OF WASHINGTON

)	
)	CIVIL PENALTY NOS.
PUGET SOUND AIR POLLUTION)	8760, 8761, 8801 and 8929
CONTROL AGENCY	j	
)	CONSENT ORDER AND
vs.	j j	ASSURANCE OF
	ý	DISCONTINUANCE
ASH GROVE CEMENT COMPANY	j	
	j j	

Puget Sound Air Pollution Control Agency (PSAPCA) issued and served to Ash Grove Cement Company (Ash Grove) the following Notice and Orders of Civil Penalties and Notices of Violation:

Notice and Order of Civil Penalty No. 8801 in the amount of \$8,000.00, dated February 10, 1998, based on Notice of Violation Nos. 36863 and 36864, alleging that Ash Grove violated Section 9.11(a) of PSAPCA Regulation I on July 16, 1997 and September 8, 1997, by causing or allowing the emission of portland cement clinker which interfered with the enjoyment of life or property.

Amended Notice and Order of Civil Penalty No 8760 in the amount of \$8,000.00, dated December 11, 1997, based on Notice of Violation No. 36861, alleging that Ash Grove violated Sections 9.15(c) and 9.20 of PSAPCA Regulation I on August 7, 1997, by causing or allowing five large holes in the shrink wrap covering clinker conveyor 531.030 with resulting dust emissions from the conveyor.

Notice and Order of Civil Penalty No. 8761 in the amount of \$3,000.00, dated December 9, 1997, based on Notice of Violation Nos. 37062 and 37063 alleging that Ash Grove violated Sections 9.15(c) and 9.20 of PSAPCA Regulation I on July 16, 1997, by causing or allowing large holes in the shrink wrap temporary conveyor enclosure on the south conveyor from the clinker storage silos to the finish mill and continuous emissions of dust from the white fly ash silo locate on the south side of the six pack.

Notice and Order of Civil Penalty No. 8929 in the amount of \$3,000.00, dated October 21, 1998, based on Notice of Violation No. 37075, alleging that Ash Grove violated Sections 9.15(a) and 9.20 of PSAPCA Regulation I on August 14, 1998, by causing or allowing dust emissions from finish mill #2 baghouse, and fugitive dust emissions in the yard between the clay shed and the truck dump area during loader activity.

Notice of Violation No. 37442 alleging that Ash Grove violated Section 9.11(a) of PSAPCA Regulation I on April 27, 1998.

CONSENT ORDER AND ASSURANCE OF DISCONTINUANCE - 1

Notice of Violation No. 37444 alleging that Ash Grove violated Section 9.11(a) of PSAPCA Regulation I on April 29, 1998.

Additionally, PSAPCA has expended, or been billed, the amount of \$3,000.00 for analyzing particulate matter alleged to have resulted from Ash Grove emissions.

Ash Grove denies the violations alleged above. To avoid the expense and uncertainty of litigation, the parties enter into this Consent Order and Assurance of Discontinuance (AOD) to resolve the claims asserted in the above referenced Notices of Civil Penalties and Notices of Violation, and other disputes between the parties regarding fugitive emissions from Ash Grove's plant occurring prior to the effective date of this AOD. This AOD specifically resolves all claims regarding violations or alleged violations by Ash Grove of Regulation I, Sections 9.11(a), 9.15(c), and 9.20 and of WAC 173-400-040(2) and (8) arising subsequent to May 23, 1996, and prior to the effective date of this AOD.

To maintain compliance with PSAPCA Regulation I, sections 9.11(a), 9.15(c) and 9.20, Ash Grove agrees to the following:

- 1. Within 30 days of the effective date of this AOD, Ash Grove shall pay to PSAPCA the amount of \$12,000.00 (twelve thousand dollars) in civil penalties for fugitive emissions from Ash Grove's plant occurring prior to the effective date of this AOD.
- 2. Within 60 days of the effective date of this AOD, Ash Grove shall submit to PSAPCA for review and comment, a study plan to investigate the source(s) of fugitive clinker emissions from the Seattle plant, and a list of potential projects to reduce fugitive clinker emissions. Projects shall be selected for study based on operational feasibility, cost and effectiveness in controlling fugitive emissions. Ash Grove shall give due consideration to any comments by PSAPCA and, where deemed reasonable by Ash Grove, incorporate any PSAPCA suggestions into the study plan. Within 30 days of receipt by Ash Grove of PSAPCA's written comments, Ash Grove shall retain a consultant to investigate the source(s) of fugitive clinker emissions, and to evaluate the feasibility and cost-effectiveness of the projects selected for study. The consultant shall complete the feasibility study and submit a written report within six months of the commencement of the study.
- 3. Within 7 days of Ash Grove's receipt of the above-referenced report Ash Grove shall forward a copy to PSAPCA. Within 60 days of Ash Grove's receipt of PSAPCA's comments on the report Ash Grove shall file with PSAPCA an implementation plan and schedule based on the report, including a notice of construction application for those cost-effective control projects that require PSAPCA approval under WAC 173-400-114. For cost-effective projects that do not require PSAPCA approval, Ash Grove's plan shall consist of a schedule for implementation of the project(s). Nothing in this AOD shall require Ash Grove to implement any project that Ash Grove determines to be technically infeasible or not cost-effective. PSAPCA reserves the right, however, to demand additional fugitive clinker control measures from Ash Grove, if PSAPCA determines that the measures selected by Ash Grove

for implementation will not achieve substantial progress in reducing the frequency and magnitude of particulate fallout events at Terminal 106.

4. Ash Grove shall implement a standard procedure for responding to fugitive dust complaints from neighbors. On each occasion on which Ash Grove receives timely notice from a neighbor of a fugitive dust complaint, Ash Grove shall investigate the situation, take any appropriate short term remedial measures, and advise the complainant and PSAPCA of any action or actions taken to resolve the complaint (including the actions described in this AOD).

Upon signing of this AOD by Ash Grove, PSAPCA agrees to take no further action with regard to Notice and Order of Civil Penalty Nos. 8760, 8761, 8801, and 8929, and further agrees to close, without further action, Notice of Violation Nos. 37442, 37444 and 37075, none of which are the subject of a Notice and Order of Civil Penalty.

Reservation of Rights

Nothing in this AOD shall preclude PSAPCA from taking other enforcement action for any future violation of PSAPCA regulations or future violations of Chapter 70.94 of the Revised Code of Washington.

Compliance with Other Laws

Nothing in this AOD shall be construed as excusing Ash Grove from compliance with any applicable federal, state, or local statutes, ordinances, or regulations, or from compliance with any permits. If any of the tasks described in this AOD are not yet complete when PSAPCA issues a Title V permit to Ash Grove for the Seattle plant, such tasks shall be included in the permit as methods to assure compliance with PSAPCA Regulation I, Sections 9.11(a), 9.15(c) and 9.20. This AOD shall not be construed as a determination that Ash Grove is out of compliance with Sections 9.11(a), 9.15(c) or 9.20, for the purposes of WAC 173-401-630(3) or WAC 173-401-510(2)(h).

Authority

The parties each represent and warrant that they have full power and actual authority to enter into this AOD and carry out all actions required of them by this AOD. All persons executing this AOD in representative capacities represent and warrant that they have full power to bind the parties for whom they are acting as representatives.

Full Understanding and Independent Legal Counsel

The parties each acknowledge, represent and agree that they have read this AOD and that they have been fully advised by their own legal counsel regarding their legal rights with respect thereto.

Effective Date and Term

This agreement shall take effect upon the date of signing by PSAPCA and shall terminate upon completion by Ash Grove of the projects described in the implementation plan to be submitted pursuant to Paragraph 3 above.

ASH GROVE CEMENT COMPANY

Dennis J. McLerran

Air Pollution Control Officer

20/0/08

Date 12/9/98

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y James L. Nolar

Director - Compliance

Date 1/24/

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APPENDIX II:

THE STUDY PLAN AND POTENTIAL PROJECTS TO REDUCE FUGITIVE CLINKER EMISSIONS

ASH GROVE CEMENT COMPANY



January 21, 1999

Mr. James Nolan Director, Compliance Division Puget Sound Air Pollution Control Agency 110 Union Street, Suite 500 Seattle, WA. 98101-2038

Re: Consent Order and Assurance of Discontinuance Civil Penalty Nos. 8760, 8761, 8801, 8929

Dear Jim:

Please find enclosed for PSAPCA's review the following items as specified in the above AOD:

- 1. A study plan to investigate the source(s) of fugitive clinker emissions.
- 2. A list of potential projects to reduce fugitive clinker emissions.

We look forward to receiving your comments and suggestions.

				truly,	
****				12	eald Alt Swan
on the reverse side?	SENDER: **Gomplete Items 1 and/or 2 for additional services. **Complete Items 3, 4a, and 4b. **Print your name and address on the reverse of this form so that we card to you. **Attach this form to the front of the maliplece, or on the back if space permit. **Write*Return Receipt Requested** on the maliplece below the article **The Return Receipt will show to whom the article was delivered and delivered.	e does not e number. d the date	I also wish to red following service extra fee): 1.	e (for an ee's Address ed Delivery	. Brown ; Safety and Environment ষ্ট্ৰ
ADDRESS completed of	8. Article Addressed to: Mr. James Molan Dirictor Comphance Duisen PSAPCA 110 Union Street, Street 500 Scattle Wa 98101-2038	/ 70	419 014 Type Id Mail Selpt for Merchandise Selivery 72 -99		you for using Return Rec
Is your HETA	5. Received By: (Print Name) 6. Signature: (Addressee or Agent) X PS Form 3811. December 1994	8. Addresses and fee is	S's Address (Only paid) Domestic Ret	· · · · · · · · · · · · · · · · · · ·	T

14671 West Bow Hill Road Bow, WA 98232 Home Phone Email dmaars@cnw.com

January 13, 1999

Mr. Gerald Brown
ASH GROVE CEMENT CO.
3801 East Marginal Way South
Seattle, WA 98134

Dear Jerry,

Please find enclosed two copies of "The Plan to Investigate Source(s) of Fugitive Clinker Emissions".

This will complete my part of the first part of Point 2 of the Assurance of Discontinuance (AOD) from The Puget Sound Air Pollution Control Agency (PSAPCA) dated November 24, 1998.

The comments by the reviewers of the final draft have been included.

Sincerely,

David Maars

Enclosures

cc: H. Voldbeck

Compliance with the Assurance of Discontinuance

The Assurance of Discontinuance (AOD) presented to Ash Grove Cement by the Puget Sound Air Pollution Control Agency (PSAPCA) signed by PSAPCA on November 24, 1998 stipulates that --- 'a study plan to investigate the source(s) of fugitive clinker emissions from the plant' --- be prepared.

The Plan to Investigate Source(s) of Fugitive Clinker Emissions

The following are items to be considered to investigate the source(s) of fugitive clinker emissions from the plant:

- 1. Retain a consultant with operational experience to assist in identifying fugitive clinker emission source(s) by conducting an independent review.
- 2. Identify the potential sources of fugitive clinker emissions:
 - (a) Observe process and conveying equipment during operations.
 - (b) Concentrate on the transfer points where clinker is transferred from one conveyer to another.
- 3. Determine if housekeeping practices are adequate to prevent fugitive clinker dust. Do the housekeeping practices themselves generate fugitive clinker dust?
- 4. Review current fugitive clinker emissions control practices/methods:
 - (a) When the plant (kiln) is in operation.
 - (b) When the plant or portions of the plant are down (maintenance).
 - (c) Do these practices contribute to fugitive clinker emissions?
- 5. Review employee training for controlling fugitive clinker emissions:
 - (a) New employee training.
 - (b) Employee refresher training.
 - (c) Training for maintenance personnel.
 - (d) Emphasis for controlling fugitive clinker emissions while on the job.
 - (e) Review training for contractors and other non Ash Grove personnel.
- 6. Review/study plant operational practices:
 - (a) Determine effect of operational practices on fugitive clinker emissions.

- (b) Action taken when process creates fugitive clinker emissions.
- (c) Is maintenance done to correct/contain fugitive clinker emissions when they occur?

Compliance with the Assurance of Discontinuance

The Assurance of Discontinuance (AOD) presented to Ash Grove Cement by the Puget Sound Air Pollution Control Agency (PSAPCA) signed by PSAPCA on November 24, 1998 stipulates that --- 'a study plan to investigate the source(s) of fugitive clinker emissions from the plant' --- be prepared.

The Plan to Investigate Source(s) of Fugitive Clinker Emissions

The following are items to be considered to investigate the source(s) of fugitive clinker emissions from the plant:

- 1. Retain a consultant with operational experience to assist in identifying fugitive clinker emission source(s) by conducting an independent review.
- 2. Identify the potential sources of fugitive clinker emissions:
 - (a) Observe process and conveying equipment during operations.
 - (b) Concentrate on the transfer points where clinker is transferred from one conveyer to another.
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 - (a) When the plant (kiln) is in operation.
 - (b) When the plant or portions of the plant are down (maintenance).
 - (c) Do these practices contribute to fugitive clinker emissions?
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 - (a) New employee training.
 - (b) Employee refresher training.
 - (c) Training for maintenance personnel.
 - (d) Emphasis for controlling fugitive clinker emissions while on the job.
 - (e) Review training for contractors and other non Ash Grove personnel.
- 6. Review/study plant operational practices:
 - (a) Determine effect of operational practices on fugitive clinker emissions.

- (b) Action taken when process creates fugitive clinker emissions.
- (c) Is maintenance done to correct/contain fugitive clinker emissions when they occur?

PSAPCA Consent Order and Assurance of Discontinuance Civil Penalty Nos. 8760, 8761, 8801, 8929

Potential Projects to Reduce Sources of Fugitive Clinker Emissions.

In accordance with the AOD signed November 24, 1998, the following is a list of potential projects to reduce sources of fugitive clinker emission.

- 1. Isolate the head end of the pan conveyer at the top of the G-cooler. An interior wall constructed to separate the head end from the incline section of the pan conveyer should prevent excessive heat buildup in the head end section. This should eliminate dust escaping with hot air from the top of the enclosure. The duct from the G-Cooler dust collector currently used for general ventilation in the head end would be relocated to vent the pan conveyer incline enclosure. The dust collector duct currently on the discharge end of the pan conveyer would remain.
- 2. Install a 4000 CFM zipper duct to the tripper car and a 2000 CFM duct to the head pulley of the existing clinker transfer conveyer. Both ducts will supply a 6000 cfm dust collector, which will exhaust below the floor level inside the building. The make up air will be supplied by the cooler air transferred up through the adjacent conveyer enclosure thereby cooling the tripper room. An additional tee will be supplied in the duct to accommodate a future vacuum line. This will help capture dust generated at tripper car discharge.
- Evaluate the conversion of the 5 existing dust collectors on top of the clinker silos to pulse jet type collectors.
- 4. Evaluate the conversion of the 5 existing open belt conveyers on top of the clinker silos to a drag chain conveyer system to eliminate ten transfer points. Please note that this project is a viable alternative to item #3.